High Technology, Inc.

DATA BASE MANAGEMENT SYSTEM

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USER'S MANUAL

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INTRODUCTION

Many tasks which computers are called upon to perform involve the sorting, searching, and printing of the information contained in a large data base. In businesses, for example, computers are used for mailing list management, inventory record control, personnel record management, and other functions. Lawyers and doctors use computers to maintain client records, patient histories, and journal references. Schools use computers to keep track of faculty and student records. And home computer users sometimes want their computers to keep track of friends' birthdays, Christmas card lists, or recipes.

The Data Base Management System can provide quick access to the information stored in its data bases. This means that you can retrieve the data you want quickly and with a minimum of effort. Consider the case of inventory records stored in the Data Base Management System. Among the many reports you could obtain from an inventory data base, here are five examples:

1. A listing of all the items in inventory sorted numerically by stock number.
2. A list of items in the order of increasing price.
3. All items of which there are fewer than 10 in stock.
4. An alphabetical list of all items on shelf 14.
5. The item with stock number 144159.

In general, the DATA BASE MANAGEMENT SYSTEM can provide you with a list of the data in your data base file sorted by any of the field(s). And furthermore, as we'll discuss later, you may obtain almost any "sublist" of the items through the use of "acceptance criteria".

Some new terms which you will need to know are data file, record, and field. Continuing with the example of inventory records, the data file would be all the information about all items in inventory. A record would be all the information about one specific item. Each element within a record (e.g. stock number) is called a field. This is illustrated in Figure 1. on the following page:

Data File	Record	Field	Item Name	Acme Computer
			Stock Number	144567
			Retail Price	2167
			Wholesale Price	1825
			Shelf No.	11
			Quantity On Hand	63
			Item Name	Bradley Printer
			Stock Number	617838
			Retail Price	1774
			Wholesale Price	1549
			Shelf No.	10
			Quantity On Hand	40
			.	
			.	
			.	
			Item Name	Zilok Display
			Stock Number	289394
			Retail Price	199
			Wholesale Price	138
			Shelf No.	7
			Quantity On Hand	115

FIGURE 1.

GETTING STARTED

To begin using your new Data Base Management System, place the Data Base Management System diskette into your disk drive. Be sure that this drive is connected to the Slot 6, Drive 1 connector inside the computer. If you aren't sure about doing this, either see the Apple Disk Operating System manual or call your local Apple dealer.

After you have the disk inserted into the correct drive, press the RESET button, then type the following commands into the computer, hitting RETURN after each command:

```
control-B
PR#6
```

(control-B is typed by holding down the CTRL key and pressing B.)

This causes the disk to "boot up" the system.

After a few seconds, the copyright notice will be displayed briefly, and then the Menu will appear on the screen. The system is now ready to use. The following sections describe the use of each option on the Data Base Management System menu of programs.

OPTION 0 - EXIT FROM THE DATA BASE SYSTEM

PURPOSE:

Select this option when you are finished working with the system, so that it will halt in an orderly way. Do not exit from the system in any other way but this one.

PROCEDURE:

Simply enter a '0' to select Menu option 0, and the system will halt. To start again, re-boot the system according to the instructions in the "Getting Started" section of this manual.

MENU

In a restaurant, you select which meal you want with the menu. In the Data Base Management System, you use the Menu to select the function which you want to perform. The Menu has fourteen options. They are:

0. Exit the Data Base System;
1. Create a New Data Base System;
2. Examine the Present System Layout;
3. Modify the Present System Layout;
4. Enter New Data Into the System;
5. Modify the Entered Data;
6. Search the Data Base;
7. Print the Data with User's Format;
8. Print the Data with Mailing List Format;
9. Sort the Data Base;
10. Examine the Catalog;
11. Delete a Data Base System;
12. Initialize a Data Diskette;
13. Update System Parameters.

When you decide which function you want to run, simply enter the number, and press RETURN.

fields you defined in STEP 1. (If the field is type N, then the sort will be numeric; if the field is type A, then the sort will be alphabetic.) You can sort multiple fields, too. This means that a mailing list, for example, can be alphabetized (alphabetically sorted) by state, and, within each state sorted by city, and within each city sorted by the person's name.

STEP 4. Once you have filled in the sheet, it is time to enter the information into the computer. Select Menu option 1. When this option is run, the first thing you will be asked to enter into the computer is the name of the MASTER FILE. Enter the name from your worksheet, then press RETURN. (The computer will automatically append ".MST" to the master file name you enter before saving it to disk to avoid conflict with other files associated with the same MASTER FILE.)

STEP 5. Next, you will be prompted to enter the information from your worksheet about the fields you want. You will see "FIELD" followed by the field number. You must then type in the description (name) of that field from the worksheet and press RETURN. Next, it will say "LENGTH". Type in the length of the field and press RETURN. Then the computer will prompt you with "NUMERIC (N) OR ALPHABETIC (A)". Enter the type and press RETURN.

Then it will go on to ask you for the same information for the next field. You just continue entering the information until you have entered in the last field on the worksheet. Then, in order to get the computer to stop asking you for "FIELD"s, you simply type END when it asks you to enter the next "FIELD".

STEP 6. You must now enter the "sort information" from your worksheet. First you'll be asked how many sorts you are going to enter. The prompt will say: "NUMBER OF SORTS". Use the worksheet to see how many sorts you have there. Enter that number, then press RETURN. NOTE: You must enter at least one sort, even if you did not write one down on the worksheet.

Then, for each sort:

(1) When you're asked to enter the "NUMBER OF SUB-FIELDS" in the sort you enter the appropriate number from the worksheet and press RETURN (the NUMBER OF SUB-FIELDS means how many fields you want to sort by).

(2) When you're asked to enter the actual "SUB-FIELD"s for the sort, enter the field numbers in the sub-field columns for that sort (from left-to-right, beginning with sub-field column "1"). After each entry, press RETURN.

After doing all of the above, the blueprints for your data base system have been fully drawn up. The screen displays the names it has assigned to the disk files it will be using to store the actual data and sort keys. (The data file has the extension of .DAT, and the sort files each have the extension of .SRT.) Like all of the programs, this one returns you to the Menu so you can perform further operations.

OPTION 1 - CREATE A NEW DATA BASE SYSTEM

PURPOSE:

With this option you set up the structure of your data base.

PROCEDURE:

To use the Data Base Management System for your own data base management, you must first create the structure of your system. This structure is stored on diskette in what is called a Master File.

To create the structure of your system, you must give the computer the following information:

1. the description (name) of each field of data;
2. the type of data which will be stored in each field (numeric or alphabetic);
3. the maximum number of characters you will store in each field (the length);
4. The ways that you need the data to be sorted

Before defining the structure of your data base, you will need to give it some thought. To help you organize your thoughts, a worksheet has been provided for you at the end of the manual. Each time you want to create a new data base, you should first fill out a Data Base Configuration sheet.

STEP 1. At the top of the worksheet, fill in the name you want to give to your new data base file. (This name must begin with a letter of the alphabet and may not include a comma or colon.)

STEP 2. Fill in the description (name) of each field, its maximum length (maximun number of characters it will hold), and its type (numeric (type N) or alphabetic (type A)). (NOTE: an alphabetic field can hold numbers as well, but a numeric field can hold only numbers, a decimal point, and + or -.)

STEP 3. Next fill in all the ways in which you will want the data sorted. You'll notice that beside each field name there is a corresponding field number. Use the field number rather than the field name in defining the sorts you want. You'll understand why soon.

The records in your data base may be sorted by any of the

OPTION 3 - MODIFY THE PRESENT SYSTEM LAYOUT

PURPOSE:

To make modifications to the Master file.
You may make the following modifications:

1. Change the description of a field;
2. Specify new sorts.

PROCEDURE:

This option prints out the names of each field, along with the field number, and asks WHICH FIELD TO CHANGE. Type in the number of the field you want to change. The computer then will print the following:

OLD FIELD - XXXXXXXXXX
NEW FIELD - _____

The XXXXXXXX stands for whatever the field name used to be. In response to the NEW FIELD prompt, type in the new name of the field. The computer will then re-print all of the fields, and will again ask WHICH FIELD TO CHANGE. You can either make more changes, or you can type END.

After making all modifications to the names of the fields, the computer will ask you WOULD YOU LIKE TO CREATE NEW SORTS. If you type a Y (yes) to this question, then you can re-enter the sorts using the same procedure you used in Option 1 (CREATE A NEW DATA BASE SYSTEM).

W A R N I N G ! ! ! - IF YOU DO CREATE NEW SORTS THEN YOU MUST REMEMBER TO RUN OPTION 9 IMMEDIATELY AFTERWARDS. IF YOU TRY TO RUN OTHER OPTIONS BEFORE YOU RUN OPTION 9, THEN THE ENTIRE DATA BASE MAY BE DELETED!!!

OPTION 2 - EXAMINE THE PRESENT SYSTEM LAYOUT

PURPOSE:

This option allows you to look at the structure of a data base system as specified in a Master file.

PROCEDURE:

Simply choose option 2, and the layout of the present system will be displayed. If you answer Y (yes) to the question "SHALL I LIST ON THE PRINTER", then the the layout will go to the printer as well as the screen. Here is a sample layout. This one is for the inventory system described in the previous section. (The corresponding worksheet used to create this sample data base is seen in Figure 2.)

FIELD	DESCRIPTION	TYPE
1	ITEM NAME	25,A
2	STOCK NUMBER	5,N
3	RETAIL PRICE	9,N
4	WHOLESALE PRICE	9,N
5	SHELF NO.	4,N
6	QUANTITY ON HAND	3,N

SORT	DESCRIPTION
1	STOCK NUMBER
2	ITEM NAME
3	SHELF NO.
	*ITEM NAME
4	RETAIL PRICE
5	WHOLESALE PRICE
6	QUANTITY ON HAND

The asterisk before ITEM NAME shows that it is a secondary sort field; i.e. within the same SHELF NO., records will be sorted by ITEM NAME.

After the system layout is displayed, the system will wait for you to hit RETURN before it goes back to the Menu.

OPTION 5 - MODIFY THE ENTERED DATA

PURPOSE:

With this option you can change and delete the records in your data base. You can also use it just to display them.

PROCEDURE:

When you run option 5, it first requests the SORT NUMBER. This should be one of the sorts you defined in your data base. The records will be listed in the order of this sort.

The program next prompts you with the question WOULD YOU LIKE TO ENTER ACCEPTANCE CRITERIA. If you want to see every record in the data base, then respond N (no) to this question. However if you wish, you can enter ACCEPTANCE CRITERIA and only those records which meet them will be listed. Specify the field you want checked as a basis for acceptance, a relational operator (<, >, <>, =), and the value to be used as a basis for acceptance. For example, using our inventory control data base, suppose you wanted to display the item with stock number 234567. You would enter the following:

```
FIELD TO TEST?2
RELATIONAL SYMBOL (<,>,<>,=)?=
TEST QUANTITY?234567
FIELD TO TEST?END
```

The computer will list each record meeting the acceptance criteria (if any) one by one. It will then ask the question: CONTINUE?. You have the following options with which to respond to this:

C - Change the record;
D - Delete the record;
RETURN - Go on to the next record;
E - Exit, and get a new sort number;

When E is typed, or when there are no more records meeting the acceptance criteria (if any), then the computer asks for a new SORT NUMBER. You may either enter another one, or type END, which will return you to the Menu.

OPTION 4 - ENTER NEW DATA INTO THE SYSTEM

PURPOSE:

With this option, you enter records into your data base one at a time.

PROCEDURE:

This option will display each field name individually, followed by a question mark, and allow you to type in data to put in that field. For example, using our inventory control data base, this option works like this (data typed in by the user is underscored):

```
ITEM NAME :?NORTH POLE DISK DRIVE
STOCK NUMBER     :?678223
RETAIL PRICE     :?1299.00
WHOLESALE PRICE :?1000.00
SHELF NO.        :?2
QUANTITY ON HAND:?9
```

After you type in a whole record the computer will re-print the information you entered, and prompt you with the word VERIFY. If everything is correct, then just hit RETURN. But if there is an error in one or more fields, then just type in the number of the incorrect field. The incorrect information will be printed, and you can enter the correct data. After this, the computer will print the corrected record. It will then return to the VERIFY point. At this stage, you can either hit RETURN, indicating all is correct, or you can type in the numter of another incorrect field.

When all corrections have been made, and you respond to VERIFY with RETURN, then the computer will put the verified record you just entered onto disk.

Then you will be prompted to enter another record. When you have entered all the records you want to enter, just type END for the first field, and you will be returned to the Menu.

NOTE: As each record is entered, it is put at the end of the sort files. To obtain sorted files, you must run option 9.

OPTION 7 - PRINT THE DATA WITH USER'S FORMAT

PURPOSE:

To generate reports with widely variable formats.

PROCEDURE:

The first thing you need to do, before even running this option, is to figure out the report format. Use the worksheet form provided in this manual to do that. The first thing on the form to fill in is the report format file name. This will be the disk file in which the computer will store your format, so you won't have to type in the specifics of the format every time you want to use it to print data.

The next thing on the form is the number of columns. Decide how many columns you want in your printout, and fill it in here.

Next you may fill in the literals,(if any) that you want printed out. (They are called 'literals' because they will be print verbatim, or "literally," along with each record.)

Now you must decide the tab for each column. The tab is simply the number of spaces from the left side of the page that the column will begin. After this is done, fill in the actual fields that you want to print in the column. You may print more than one field in each column. An important thing to remember is to leave enough room in the column to hold all of the fields that will be printed there.

The final thing to fill in is the fields which are to be summed. The totals of these fields will print at the bottom of the printout. Of course, the sum of any alphabetic field would be zero.

Now that you have completely filled in the form, you can start entering the information into the computer. The SORT NUMBER and the ACCEPTANCE CRITERIA are entered first. Then the computer will ask you to enter the name of the report format file that you want to use. If you are creating one, just hit RETURN. The computer will now ask you to enter the NUMBER OF COLUMNS, the HEADING to print for each column, and the TAB for each column. The computer now asks you to enter the LITERALS. Type END when you are finished entering LITERALS.

You are now supposed to enter the NUMBER OF LINES PER RECORD. If you are doing columnated printout, you will probably want only one line per record. Now you can enter the NUMBER OF FIELDS on

OPTION 6 - SEARCH THE DATA BASE

PURPOSE:

This function prints out all records which meet the criteria you determine.

PROCEDURE:

The operation of this program is very similar to the operation of option 5. The user enters the SORT NUMBER and ACCEPTANCE CRITERIA. The computer will then ask if you want to send the output to the printer. Next, you are asked to indicate to the computer which fields of the records you want to see.

OPTION 8 - PRINT THE DATA WITH MAILING LIST FORMAT

PURPOSE:

This program prints standard stick-on mailing labels if your data base has the proper structure.

PROCEDURE:

Your data base must have the following configuration to use this program:

```
LAST NAME;
FIRST NAME;
ADDRESS LINE 1;
ADDRESS LINE 2;
CITY;
STATE;
ZIP CODE.
```

After specifying SORT NUMBER and ACCEPTANCE CRITERIA, insert the labels into the printer. The program will print a test line for the purpose of aligning the labels in the printer.

Remember that mailing labels are only 33 characters long. Therefore, make sure that the total number of characters per line is no greater than this. This is the format of the labels:

```
[FIRST NAME] [LAST NAME]
[ADDRESS LINE 1]
[ADDRESS LINE 2]
[CITY], [STATE] [ZIP CODE]
```

the line, and then the actual field number, along with which column to print it in.

If you want the records to be numbered, then answer Y (yes) to the question WOULD YOU LIKE TO NUMBER THE RECORDS. The computer will now ask you to type a 1 beside each field you want to be summed. After you have done that, you can save the report format to disk by entering the filename on the worksheet form when told to do so. If you don't want to, then just hit RETURN.

There is another type of format you may decide you want to implement, producing mailing list type printouts. To do this, simply ask for only one column. Then, for a mailing list, you would tell the computer you wanted, say, four lines per record.

OPTION 10 - CATALOG A DISKETTE

PURPOSE:

Use this function to look at the catalog of a diskette. By looking at the catalog, you can locate data base systems stored on them.

PROCEDURE:

Simply enter the slot number and the drive number of the disk drive you want to catalog, and the catalog will be printed. Hit RETURN when you are ready to go back to the menu.

OPTION 9 - COMPACT/SORT THE DATA BASE

PURPOSE:

(1) To compact the data base and (2) to sort the data base by all of the sorting criteria defined when you created the Master File. No sorting of data is accomplished except through the use of this program.

PROCEDURE:

After you enter MENU selection 9, the SORT program will be executed. After all sorts have been accomplished, you will automatically be returned to the MENU.

OPTION 12 - INITIALIZE A DATA DISKETTE

PURPOSE:

This function allows you to prepare blank or unused diskettes to be used as data diskettes with the Data Base Management System.

PROCEDURE:

Simply choose this option and, when the computer tells you to, insert the diskette to be initialized into slot 6, drive 1. It will then be initialized. All programs and data previously contained on it will be lost. When the program has finished, boot the system as usual.

OPTION 11 - DELETE A DATA BASE SYSTEM

PURPOSE:

This function will purge from the diskette data base systems which are no longer of any use, freeing the space they took up.

PROCEDURE:

This program will ask for the name of the system you want to delete. If you change your mind, and decide not to delete one, then enter END.

After a system is deleted, the program will ask for the name of another system to delete. Enter END to return to the Menu.

5.MASTER FILE - You may be using the DBMS system for managing several different data bases, each one having a different name. To change from one data base to another, change parameter number 5 to the name of the data base that you are to ready to work with.

FOR EXAMPLE: You may have 3 Master Files named INVENTORY, MAIL LIST, and TRIVIA. When you are through working with the Master File named INVENTORY and ready to begin working with the Master File named MAIL LIST, you must first run MENU selection 13 and change parameter number 5 from INVENTORY to MAIL LIST.

6.SLOT,DRIVE - enter the slot# and drive# where your data file diskette will reside. The data file diskette is the diskette which holds your Master File.

YOUR DATA FILES MAY NOT BE STORED ON THE PROGRAM DISKETTE

Your program diskette must reside in SLOT 6, DRIVE 1. Your data file diskette may also reside in SLOT 6, DRIVE 1 or it may reside elsewhere if you have more than one disk drive.

If you have only one disk drive, then for parameter number 6 you should enter SLOT 6, DRIVE 1. Then during the execution of the programs of the DBMS system, you will be instructed at the appropriate time to remove the program diskette and insert the data diskette and vice versa.

OPTION 13 - UPDATE SYSTEM PARAMETERS

PURPOSE:

Allows you to change from working with one data base Master File to another. Allows you to enter and/or change the parameters which describe your hardware configuration.

PROCEDURE:

Six items are displayed. You have the option of changing any or all of them. To do so, enter the number displayed to the left of the one that you wish to change. Then you'll be prompted to enter the new information. To exit the program, enter "END" when asked which item you will change.

Here is a sample display:

```
1. PRINTER SLOT        1
2. PRINTER TYPE        PARALLEL (D)
3. LINES PER PAGE      66
4. PRINTER WIDTH       132
5. MASTER FILE         INVENTORY
6. SLOT, DRIVE         7,1

WHICH ITEM WILL YOU CHANGE?___
```

EXPLANATIONS:

1.PRINTER SLOT - enter the slot# where your printer interface card resides.

2.PRINTER TYPE - your 2 choices are PARALLEL and SERIAL. Enter the appropriate choice. If you have a parallel interface, then you'll be asked whether you want to enable or disable a line feed. For most parallel printers, your choice should be to disable the line feed. But if your DBMS system print-outs are printed all on one line, then to alleviate the problem, you should change this parameter to enable the line feed.

3.LINES PER PAGE - enter the length of your printer paper in terms of lines per page.

4.PRINTER WIDTH - enter the width of your printer in terms of characters per line.

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PRINTING FORMAT WORKSHEET

NAME OF FORMAT FILE _____

NUMBER OF COLUMNS ____

LITERALS:
1 _____
2 _____
3 _____
4 _____
5 _____
6 _____
7 _____
8 _____

Column #	Tab	Fields
1	___	___, ___, ___, ___, ___, ___, ___, ___, ___, ___
2	___	___, ___, ___, ___, ___, ___, ___, ___, ___, ___
3	___	___, ___, ___, ___, ___, ___, ___, ___, ___, ___
4	___	___, ___, ___, ___, ___, ___, ___, ___, ___, ___
5	___	___, ___, ___, ___, ___, ___, ___, ___, ___, ___
6	___	___, ___, ___, ___, ___, ___, ___, ___, ___, ___
7	___	___, ___, ___, ___, ___, ___, ___, ___, ___, ___
8	___	___, ___, ___, ___, ___, ___, ___, ___, ___, ___
9	___	___, ___, ___, ___, ___, ___, ___, ___, ___, ___
10	___	___, ___, ___, ___, ___, ___, ___, ___, ___, ___

FIELDS TO BE SUMMED: ___, ___, ___, ___, ___, ___, ___, ___, ___

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DATA BASE CONFIGURATION WORKSHEET
FOR SYSTEM NAMED _____

Field no.	Field Name	Length	Type
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Sort No.	Sub-field									
	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

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DATA BASE CONFIGURATION WORKSHEET
FOR SYSTEM NAMEDINV-EXAMPLE

Field no.	Field Name	Length	Type
1	ITEM NAME	25	A
2	STOCK NUMBER	5	N
3	RETAIL PRICE	9	N
4	WHOLESALE PRICE	9	N
5	SHELF NO.	4	N
6	QUANTITY ON HAND	3	N
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Sort No.	Sub-field									
	1	2	3	4	5	6	7	8	9	10
1	2									
2	1									
3	5	1								
4	3									
5	4									
6	6									
7										
8										
9										
10										

FIGURE 2.

APPENDIX A
ERRORS AND ERROR MESSAGES

Occasionally, errors in program execution may occur. These arise from two sources. The first is that all long programs have minor errors, or "bugs," in them. These can creep into even the most exhaustively checked programs. The Data Base Management System, although having undergone extensive testing, is no exception to this rule. The second cause of errors, and the most common one, is improper operation of working programs by the user.

Normal error reporting as in Applesoft BASIC does not take place while the Data Base Management System is running. Instead, whenever an error in program execution occurs, the "code number" of the error is printed along with the program line number in which the error occurred. The following error codes usually arise from user error:

Error code 4 - Write protect error. This means that you have failed to remove the write protect tab from a diskette on which the Data Base Management System has attempted to store a system configuration. The remedy is, of course, to remove the tab and re-do the operation. For additional information on write-protect tabs, see the Apple Floppy Disk Subsystem Operating Manual.

Error code 6 - File not found error. You have either withdrawn the program diskette from its drive, put it in a drive not connected to slot 6, drive 1, or you didn't insert the program diskette when the computer told you to. The program diskette must reside in slot 6, drive 1, at all times when the package is in use.

Error code 7 - Volume mismatch. This annoying error results from the use of a data diskette that has a different volume number from the program diskette. The solution is to use only diskettes with a volume number of 1 with this package. Diskettes initialized with the Initialize program all have a volume of 1.

Error code 8 - Disk I/O error. This error also can mean one of several things. What has happened is that, in attempting to access the disk drive, the computer has found something wrong with the continuity of the magnetic patterns on the diskette. The causes of this error include disk inserted improperly, no disk in disk drive, malfunctioning diskette, and broken disk drive. Also, if you have forgotten to initialize the data diskette in accordance with the instructions in Apple's manual, this error will occur. There is no easy solution to this problem (unless, of course, its only an empty drive or an un-initialized diskette). The best policy is to create a test system on a known good diskette. If the problem recurs, you can assume the equipment to be at fault. If not, the problem was probably only with the diskette.